

1 Complete each of the following:

4

- a The proportion is
- b The first proportion of the numbers 5, 10 and 20 is
- c 7201 ml = liters
- d If the sum of all edges of a cube is 132 cm, then its volume = cm^3

2 Choose the correct answer:

4

- a If Mostafa can translate 40 words in 8 minutes, then the rate of translation is
- 5 minutes/word • 6 words/minute • 5 words/minute • 8 words/minute
- b The value of y that makes the two fractions $\frac{7.5}{y}$ and $\frac{1.5}{0.3}$ in proportion is
- 1.95 • 5 • 1.5 • 0.3
- c The suitable unit for measuring the capacity of a swimming pool in a sports club is
- m^3 • cm^3 • ml • dm^3
- d A car consumes 15 liters of fuel every 180 hours. Then the number of liters of the fuel which the car consumes in 144 hours = liters.
- 10 • 16 • 18 • 12

3 Solve the problem :

2

A cuboid-shaped tin with inner dimensions 30 cm,
40 cm and 50 cm is completely filled with oil.

Calculate the price of oil if the price of one liter is L.E. 15.

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.....

1 Complete each of the following:

4

- a If a train covers 150 km in 5 hours, then the speed of the train is km/hour.
- b If $\frac{5}{x} = \frac{15}{24}$, then $x =$
- c 495 ml = dm^3
- d If the perimeter of one face of a cube is 32 cm, then its volume = cm^3

2 Choose the correct answer:

4

- a If $\frac{x-3}{21} = \frac{2}{7}$, then $x =$
- 6 • 9 • 12 • 3
- b The volume of a cuboid with a square base of side length 6 cm and its height is 10 cm = cm^3
- 60 • 120 • 360 • 600
- c If 100 gm of food give 400 calories, then the number of calories which 20 gm of the same food give = calories.
- 80 • 100 • 8 • 100
- d The unit of measuring capacity is
- meter • square meter • kilometer • liter

3 Solve the problem:

2

If $\frac{3}{4}$ L of a certain medicine is packed in small bottles where the capacity of each bottle is 25 mL. Find the number of the bottles needed to pack the medicine.

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.....

1 Complete each of the following:

4

- a If 3, $x - 1$, 4 and 8 are in proportion, then $x = \dots\dots\dots$
- b The volume of the cube = $\dots\dots\dots \times \dots\dots\dots \times \dots\dots\dots$
- c If $\frac{x}{8} = \frac{1.5}{2.4}$, then $x = \dots\dots\dots$
- d $3.45 \text{ liters} + 0.5 \text{ dm}^3 + 50 \text{ cm}^3 = \dots\dots\dots \text{ liters.}$

2 Choose the correct answer:

4

- a If Hossam covers 420 meters within 20 minutes, then the rate of what Hossam covers per minute = $\dots\dots\dots$
- 21 minutes/meter
 - 21 meters/minute
 - 12 meters/minute
 - 12 minutes/meter
- b If the ratio 7 : 13 is the same ratio as $x : 52$, then $x = \dots\dots\dots$
- 14
 - 21
 - 28
 - 35
- c $5 \text{ m}^3 = \dots\dots\dots \text{ dm}^3$
- 0.005
 - 50
 - 500
 - 5000
- d If the area of one face of a cube is 25 cm^2 , then its volume = $\dots\dots\dots \text{ cm}^3$
- 5
 - 20
 - 25
 - 125

3 Solve the problem:

2

A metal cube of edge length 20 cm was melted and turned into a cuboid with base dimensions 16 cm and 50 cm. Find the height of the cuboid.

.....

.....

.....

1 Complete each of the following:

- a The proportion is the equality of two ratios or more.
- b The first proportion of the numbers 5, 10 and 20 is 2.5
- c 7201 ml = 7.201 liters
- d If the sum of all edges of a cube is 132 cm, then its volume = 1331 cm³

2 Choose the correct answer:

- a If Mostafa can translate 40 words in 8 minutes, then the rate of translation is
- 5 minutes/word • 6 words/minute • **5 words/minute** • 8 words/minute
- b The value of y that makes the two fractions $\frac{7.5}{y}$ and $\frac{1.5}{0.3}$ in proportion is
- 1.95 • 5 • **1.5** • 0.3
- c The suitable unit for measuring the capacity of a swimming pool in a sports club is
- **m³** • cm³ • ml • dm³
- d A car consumes 15 liters of fuel every 180 hours. Then the number of liters of the fuel which the car consumes in 144 hours = liters.
- 10 • 16 • 18 • **12**

3 Solve the problem :

A cuboid-shaped tin with inner dimensions 30 cm,
40 cm and 50 cm is completely filled with oil.

Calculate the price of oil if the price of one liter is L.E. 15.

The volume of the cuboid = $L \times W \times H = 30 \times 40 \times 50 = 60\,000$ cm³

The capacity of the tin in liters = $60\,000 \div 1000 = 60$ liters

The price of the oil = $60 \times 15 = \text{L.E. } 900$

1 Complete each of the following:

4

- a If a train covers 150 km in 5 hours, then the speed of the train is 30 km/hour.
- b If $\frac{5}{x} = \frac{15}{24}$, then $x = \underline{8}$
- c 495 ml = 0.495 dm³
- d If the perimeter of one face of a cube is 32 cm, then its volume = 512 cm³

2 Choose the correct answer:

4

- a If $\frac{x-3}{21} = \frac{2}{7}$, then $x = \dots\dots\dots$
- 6 • 9 • 12 • 3
- b The volume of a cuboid with a square base of side length 6 cm and its height is 10 cm = 360 cm³
- 60 • 120 • 360 • 600
- c If 100 gm of food give 400 calories, then the number of calories which 20 gm of the same food give = 80 calories.
- 80 • 100 • 8 • 100
- d The unit of measuring capacity is liter.
- meter • square meter • kilometer • liter

3 Solve the problem:

2

If $\frac{3}{4}$ L of a certain medicine is packed in small bottles where the capacity of each bottle is 25 mL. Find the number of the bottles needed to pack the medicine.

$$\frac{3}{4} \text{ liter} = \frac{3}{4} \times 1000 = 750 \text{ ml}$$

$$\text{The number of the needed bottles} = 750 \div 25 = 30 \text{ bottles}$$

1 Complete each of the following:

4

- a If 3, $x - 1$, 4 and 8 are in proportion, then $x = \underline{7}$
- b The volume of the cube = edge length \times edge length \times edge length
- c If $\frac{x}{8} = \frac{1.5}{2.4}$, then $x = \underline{5}$
- d $3.45 \text{ liters} + 0.5 \text{ dm}^3 + 50 \text{ cm}^3 = \underline{4}$ liters.

2 Choose the correct answer:

4

- a If Hossam covers 420 meters within 20 minutes, then the rate of what Hossam covers per minute =
- 21 minutes/meter
 - 12 meters/minute
 - **21 meters/minute**
 - 12 minutes/meter
- b If the ratio 7 : 13 is the same ratio as $x : 52$, then $x = \dots\dots\dots$
- 14
 - 21
 - **28**
 - 35
- c $5 \text{ m}^3 = \dots\dots\dots \text{ dm}^3$
- 0.005
 - 50
 - 500
 - **5000**
- d If the area of one face of a cube is 25 cm^2 , then its volume = cm^3
- 5
 - 20
 - 25
 - **125**

3 Solve the problem:

2

A metal cube of edge length 20 cm was melted and turned into a cuboid with base dimensions 16 cm and 50 cm. **Find the height of the cuboid.**

The volume of the cube = $20 \times 20 \times 20 = 8000 \text{ cm}^3$

The area of the base of the cuboid = $16 \times 50 = 800 \text{ cm}^2$

The height of the cuboid = $8000 \div 800 = 10 \text{ cm}$

Test

1

Total mark

10

1 Choose the correct answer from the given ones :

(4 marks)

1 A car covers 270 km in 3 hours , the speed of the car is km/hr.

(a) 60

(b) 80

(c) 90

(d) 120

2 A cube of edge length 7 cm. , then its volume = cm^3 .

(a) 49

(b) 28

(c) 343

(d) 42

3 5.7 L = cm^3 .

(a) 5700

(b) 570

(c) 57

(d) 5.7

4 If $\frac{3}{7} = \frac{12}{x}$, then $x =$

(a) 21

(b) 28

(c) 84

(d) 36

2 Complete :

(4 marks)

1 The proportion is

2 A machine irrigates 36 feddans in 9 hours , then the rate of the machine = feddans/hr.

3 A cube of edge length 0.2 m. , then its volume = cm^3 .

4 The capacity of cuboid shaped vessel of inner dimensions 8 cm. , 6 cm. and 3 cm. is cm^3 .

3 A container has 20 litres of oil , it is wanted to put the oil in small bottles , the capacity of each of them is 400 cm^3 . Find the number of bottles needed.

(2 marks)

Test

2

Total mark

10

1 Choose the correct answer from the given ones :

(4 marks)

- 1 Amgad spent 75 L.E. in 5 days , then the rate of what he spent
= L.E./day

(a) 15 (b) 25
(c) 35 (d) 10

- 2 If $\frac{x}{5} = \frac{16}{20}$, then $x - 2 =$

(a) 4 (b) 6
(c) 2 (d) 8

- 3 The perimeter of the base of a cube is 24 cm. ,
then its volume = cm^3 .

(a) 36 (b) 96
(c) 144 (d) 216

- 4 1.45 litre + 300 mL = mL

(a) 1.75 (b) 1750
(c) 4.45 (d) 301.45

2 Complete :

(4 marks)

- 1 The cube is a cuboid with dimensions.

- 2 $45 \text{ dm}^3 =$ litres.

- 3 If $\frac{x+5}{20} = \frac{1}{4}$, then $x =$

- 4 A printer printes 40 papers in 5 minutes , then the rate of the printer
= papers/min.

- 3 A man bought 4 kg. of apple for 100 L.E. What is the price of 12 kg. of apple ?

(2 marks)

Test

3

Total mark

10

1 Choose the correct answer from the given ones :

(4 marks)

1 If 3 , x , 9 , 15 are proportional , then $x =$

(a) 27

(b) 15

(c) 5

(d) 45

2 The sum of all edge lengths of a cube is 24 cm. ,
then its volume = cm^3

(a) 8

(b) 2

(c) 4

(d) 48

3 $75 \text{ cm}^3 =$ litres.

(a) 750

(b) 75

(c) 0.75

(d) 0.075

4 A car consumes 12 litres of fuel to cover 120 km. , then the rate of
consumption = litre/km.

(a) 10

(b) $\frac{1}{10}$

(c) 1.2

(d) 12

2 Complete :

(4 marks)

1 The capacity of a cube shaped container of inner edge length 15 cm.
is cm^3

2 The volume of a cube of edge length 1.2 dm. equals dm^3

3 A factory produces 8000 toys in 10 hours , then the rate of production
is toys/hr.

4 If $\frac{7}{x} = 0.5$, then $x =$

3 A metallic cube of edge length 18 cm. is melted and converted into small
cuboids , the dimensions of each one are 6 cm. , 6 cm. and 3 cm.
Find the number of the small cuboids.

(2 marks)

Answers of Mathematics

Answers of Test

1

- 1 1 c 2 c 3 a 4 b

- 2 1 the equality of two or more ratios

- 2 4 3 8000 4 144

- 3 The capacity of the container = $20 \times 1000 = 20000 \text{ cm}^3$

The number of bottles = $20000 \div 400 = 50$ bottles

Answers of Test

2

- 1 1 a 2 c 3 d 4 b

- 2 1 equal 2 45 3 0 4 8

3

Apples in kg.	4	12
Price in L.E.	100	?

The price of 12 kg. = $\frac{12 \times 100}{4} = 300 \text{ L.E.}$

Answers of Test

3

- 1 1 c 2 a 3 d 4 b

- 2 1 3375 2 1.728 3 800 4 14

- 3 The volume of the cube = $18 \times 18 \times 18 = 5832 \text{ cm}^3$

The volume of each cuboid = $6 \times 6 \times 3 = 108 \text{ cm}^3$

The number of cuboids = $5832 \div 108 = 54$ cuboids

SHEET (6)

Applications on ratio (Rates)

The rate is the ratio between two quantities of different kind

[1] Complete:

- (1) A family spends L.E. 480 in 6 days, the rate of what family spends per day = L.E. per day.
- (2) A worker paints a wall of area 100 m^2 at 8 hours, then the rate of work = m^2/hr .
- (3) A plough for agricultural land ploughs 12 feddans within 3 hours, then the rate of this plough = feddans/hr.
- (4) If a runner covers 600 m in 4 minutes, then the rate of distance covered in one minute is m/min.
- (5) A computer colour printer prints 60 papers each 5 minutes, then the rate of work of this printer is paper/min
- (6) A factory produces 4000 cans of juice during 8 hours, then the rate of the production = cans/hr
- (7) If a car covered 210 km within 3 hours, then the rate of covered distance per hour = km/hr.
- (8) A carpenter needs 25 m^2 of kind of wood to make 10 tables, then the rate of used wood = m^2/table .
- (9) A water tap is leaking 360 litres of water in one hour, then the leaking rate of water per minute = litre/minute.
- (10) A machine produces 600 metres of clothes regularly in one hour and half, then the rate of production = m/hr



[2] Choose the correct answer:

- (1) If a car covered 180 km in 3 hours, then the speed of this car
= km/hr. [60 or 80 or 90 or 540]
- (2) Ali spends L.E. 75 within three days, then the rate of what Ali
spends = L.E./day. [25 or 30 or 45 or 135]
- (3) If Hazem drinks 21 glasses of milk weekly, then the rate of what
he drinks daily is glasses. [20 or 7 or 14 or 3]

[3] Story problems:

- (1) A car consumes 35 litres of gas to cover 140 km. Calculate the rate
of consumption.
.....
- (2) A factory produces 5000 juice cans in 8 hours. Find the production
rate.
.....
- (3) A factory produces 7200 bottles of soft drink in 8 hours. What is
the rate of production?
.....
- (4) A water tap is leaking 20 litres of water in 5 hours. Find the
leaking rate of water per hour.
.....
- (5) A computer printer prints 120 papers each 4 minutes. Find the rate
of work of this printer.
.....
- (6) A ship for transporting goods among countries consumes 25 litres
of fuel to cover 15 km. Calculate the rate of consumption of fuel.
.....



SHEET (7)

Proportion and its properties

Proportion: is an equality of two or more ratios.

Properties of proportion:

- (1) If we multiply (or divide) each of the two terms of a ratio by the same non-zero number, then the resultant ratio is equal to the first ratio and they together form proportion.
- (2) The product of extremes = the product of means.

[1] Find the value of x in each of the following proportions:

(1) $\frac{5}{8} = \frac{15}{x}$ $x = \dots\dots\dots$

(2) $\frac{1}{2} = \frac{6}{x}$ $x = \dots\dots\dots$

(3) $\frac{2}{7} = \frac{8}{x}$ $x = \dots\dots\dots$

(4) $\frac{x}{6} = \frac{20}{30}$ $x = \dots\dots\dots$

(5) $\frac{35}{42} = \frac{x}{6}$ $x = \dots\dots\dots$

(6) $\frac{4}{5} = \frac{x}{1.25}$ $x = \dots\dots\dots$

(7) $\frac{x}{5} = 3$ $x = \dots\dots\dots$

(8) $\frac{24}{x} = 0.8$ $x = \dots\dots\dots$

[2] Use the method of the cross multiplication to find the missing number in each of the following proportions:

(1) $\frac{7}{9} = \frac{\dots\dots}{72}$ $x = \dots\dots\dots$

(2) $\frac{5}{8} = \frac{17.5}{\dots\dots}$ $x = \dots\dots\dots$



$$(3) \quad \frac{\dots}{21} = \frac{5}{6} \quad x = \dots$$

$$(4) \quad \frac{18}{\dots} = \frac{27}{49} \quad x = \dots$$

$$(5) \quad \frac{28}{49} = \frac{\dots}{35} \quad x = \dots$$

$$(6) \quad \frac{48}{64} = \frac{7.5}{\dots} \quad x = \dots$$

$$(7) \quad \frac{\dots}{14} = \frac{45}{21} \quad x = \dots$$

$$(8) \quad \frac{1.5}{\dots} = \frac{2.25}{0.6} \quad x = \dots$$

$$(9) \quad \frac{\dots}{8.8} = \frac{36}{99} \quad x = \dots$$

$$(10) \quad \frac{68}{51} = \frac{5.6}{\dots} \quad x = \dots$$

[3] Find the missing term in each of the following proportions:

$$(1) \quad 5, 6, 10 \text{ and } \dots \quad x = \dots$$

$$(2) \quad \dots, 8, 16 \text{ and } 64 \quad x = \dots$$

$$(3) \quad 18, 36, \dots \text{ and } 10 \quad x = \dots$$

$$(4) \quad 0.8, 4.8, \dots \text{ and } 12 \quad x = \dots$$

[4] Find the value of x in each of the following proportions:

$$(1) \quad 9, 21, 3 \text{ and } x \quad x = \dots$$

$$(2) \quad 5, 25, x \text{ and } 10 \quad x = \dots$$

$$(3) \quad 3, 4, 9 \text{ and } x \quad x = \dots$$

$$(4) \quad x, 12, 3 \text{ and } 4 \quad x = \dots$$



[5] Complete:

(1) $\frac{2}{5} = \frac{\dots\dots}{20}$

(2) If $\frac{2}{11} = \frac{4}{x}$, then $x = \dots\dots\dots$

(3) If $\frac{4}{7} = \frac{x}{35}$, then $x - 3 = \dots\dots\dots$

(4) The fourth proportional of 10, 14 and 20 is $\dots\dots\dots$

(5) If $\frac{x-3}{3} = \frac{5}{3}$, then $x = \dots\dots\dots$

(6) If $\frac{x+5}{3} = 7$, then $x = \dots\dots\dots$

(7) If $\frac{a}{b} = \frac{c}{d}$, then $a \times d = \dots\dots\dots$

(8) If $\frac{3}{7} = \frac{12}{y}$, then $3 \times y = \dots\dots \times \dots\dots$

[6] Choose the correct answer:

(1) If $\frac{2}{7} = \frac{x}{21}$, then $x = \dots\dots\dots$ [6 or 21 or 12 or 7]

(2) If $\frac{2}{5} = \frac{x}{20}$, then $x = \dots\dots\dots$ [8 or 6 or 4 or 2]

(3) If $\frac{x+2}{8} = \frac{3}{4}$, then $x = \dots\dots\dots$ [2 or 4 or 6 or 8]

(4) If the numbers 6, 8, 3 and x are proportional, then $x = \dots\dots$
[4 or 5 or 6 or 8]

(5) If the ratio 7 : 13 is the same ratio $x : 52$, then $x = \dots\dots$
[14 or 21 or 28 or 35]

(6) If $a : b = 2 : 5$, then $\frac{a}{a+b} = \dots\dots$ [2:5 or 2:7 or 3:7 or 7:2]



[7] Story problems:

- (1) Ali bought 5 kg of orange, he paid L.E. 15 How much money does he pay to buy 8 kg?

.....

.....

.....

- (2) If 35 litres of milk produce out 16 kg of butter. Find how many kg of butter can be produced out of 56 litres of milk.

.....

.....

.....

- (3) If 15 kg of flour produce out of 150 loaves of bread. How many loaves of bread can be produced out of 22.5 kg of flour?

.....

.....

.....

- (4) The price of 15 litres of liquid soap is L.E. 7.5 Find:

- (a) The price of 45 litres of the same soap.
- (b) Number of litres of price L.E. 11.5

.....

.....

.....

- (5) A car consumes 20 litres of petrol to cover 210 km. How many litres of petrol does the car consume to cover 630 km?

.....

.....

.....



- (6) A minaret of height 75 m, its shadow length is 25 m. Calculate the height of a tree of shadow length 2 m at the same moment.

.....

.....

.....

- (7) A primary school, its building is 14 metres and the shade of this building at a certain moment is 7 m long. What is the height of a tree in the same moment if its shade length is 2 metres?

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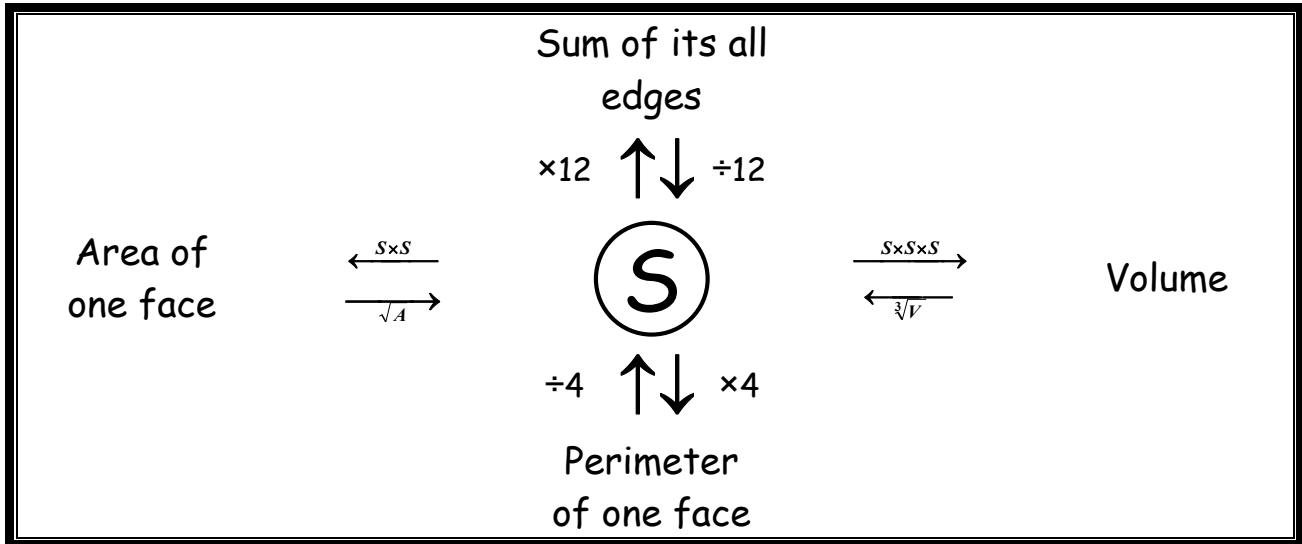


SHEET (16)

Cube

A Cube: is a cuboid with equal dimensions.

Each dimension is called edge length (S).



[A] Story problems:

- (1) What is the volume of a cube of edge length 4 cm?

.....

- (2) Find the volume of a cube with edge length 7 cm.

.....

- (3) Find the volume of a cube with edge length 3 cm.

.....

- (4) Find the volume of a cube with edge length 1 cm.

.....

- (5) Find the volume of a cube if the perimeter of one of its faces is 28 cm.

.....

.....



- (6) Find the volume of the cube if the perimeter of its base is 20 cm.

.....

.....

- (7) The sum of lengths of all edges of a cube is 108 cm. Calculate its volume.

.....

.....

- (8) If the sum of lengths of all edges of a cube is 132 cm. Calculate its volume.

.....

.....

- (9) Which is greater in volume? A cube of edge length 10 cm or a cuboid of dimensions 11 cm, 7 cm and 10 cm. Then find the difference between their volumes.

.....

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.....

- (10) A metallic cube of edge length 12 cm was melted and converted to a number of equal small cuboids of dimensions 8 cm, 2 cm and 9 cm each. Find out the number of the cuboids.

.....

- (11) A piece of metal is in the shape of a cube of edge length 9 cm was melted to be a cuboid of length 12 cm and width 9 cm. Find the height of the cuboid.

.....



- (12) A metallic piece in the shape of a cuboid its dimensions are 4 cm, 6 cm and 9 cm. It is melted and converted to a cube. Find the edge length of the cube.

.....
.....

- (13) A cube of cheese is of edge length 15 cm it is wanted to be divided into small cubes the edge length of each is 3 cm for presenting them through meals. Calculate the number of the resulting small cubes.

.....

- (14) A box made of carton in the shape of cuboid its internal dimensions are 50 cm, 40 cm and 30 cm. Its needed to fill it with cube-shaped bars of soap with edge length 10 cm. Find the number of bars.

.....

- (15) If the sum of areas of faces of a cube 150 cm^2 . Find its volume.

.....
.....
.....

[B] Complete:

- (1) The cube is a cuboid with dimensions.
- (2) If the dimensions of a cuboid are equal, then it is called a
- (3) The volume of a cube = \times \times
- (4) If the perimeter of one face of a cube is 8 cm, then its volume is cm^3 .
- (5) If the area of one face of a cube is 25 cm^2 , then its volume is cm^3 .



- (6) If the area of the base of a cube is 64 cm^2 , then its volume is cm^3 .
- (7) A cube whose volume 125 cm^3 , then its edge length is cm.
- (8) A cube whose volume 8 cm^3 , then its edge length is cm.
- (9) A cube whose volume 27 cm^3 , then its edge length is cm.
- (10) A cube whose volume 64 cm^3 , then its base area is cm^2 .
- (11) A cube of edge length 9 cm, then the sum of all its edge lengths = cm
- (12) A cube, the area of its base is 16 cm^2 , then its volume is cm^3 .
- (13) A cube, its volume is 125 cm^3 , then the area of its face = cm^2 .

[C] Choose the correct answer:

- (1) If area of one face of a cube is 1 cm^2 , then its volume is
[6 cm^3 , 4 cm^3 , 1 dm^3 , 1 cm^3]
- (2) A cube whose volume 1 cm^3 , then the sum of all its edge lengths
[24 cm , 12 cm , 6 cm , 1 cm]
- (3) The ratio between two edge lengths of the cube is
[$1 : 4$, $1 : 1$, $4 : 1$, $1 : 12$]
- (4) The cubic centimetre is a unit for measuring the
[perimeter , area , volume , length]



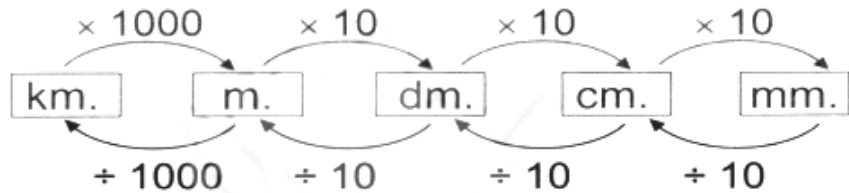
SHEET (17)

Capacity

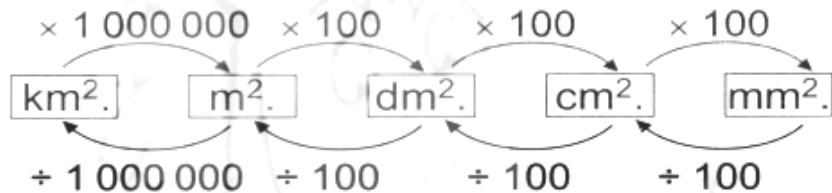
Capacity is the inner volume of a hollow solid

Litre is the unit for measuring capacity

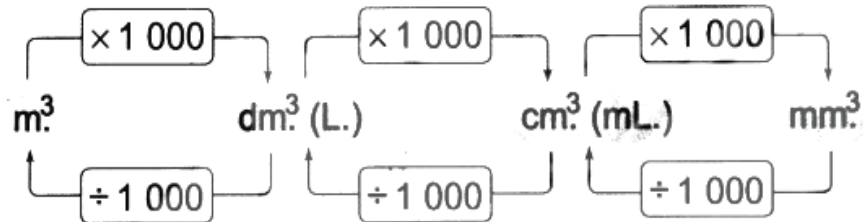
The length units



The area units



The capacity units

[1] Complete:

- (1) is the measuring unit of capacity.
- (2) 4.6 litres = millilitres.
- (3) 0.0781 L = cm³.
- (4) 2.7 dm³ = litres.
- (5) 3 dm³ = cm³.
- (6) 7 m³ = litres.
- (7) 7300 ml = dm³.
- (8) 2.22 litres = ml.



- (9) $5.6 \text{ dm}^3 = \dots\dots\dots \text{ ml}$.
- (10) $370 \text{ cm}^3 = \dots\dots\dots \text{ litres}$.
- (11) A case in the shape of a cube, its external volume is 1000 cm^3 and its capacity is 729 cm^3 , then the volume of the material that the case is made of is $\dots\dots\dots \text{ cm}^3$.

[2] Choose the correct answer:

- (1) The litre is a unit for measuring $\dots\dots\dots$
[length , distance , capacity , time]
- (2) 1 litre = $\dots\dots\dots \text{ ml}$.
[10 , 100 , 1000 , 10 000]
- (3) $51 \text{ cm}^3 = \dots\dots\dots \text{ litre}$.
[0.051 , 0.51 , 510 , 51]
- (4) 5.3 litres = $\dots\dots\dots \text{ dm}^3$.
[5300 , 0.0053 , 53 , 5.3]
- (5) $0.001 \text{ dm}^3 = \dots\dots\dots \text{ cm}^3$.
[1000 , 1 , 0.1 , 0.01]
- (6) 38 ml = $\dots\dots\dots \text{ cm}^3$.
[38000 , 3800 , 380 , 38]
- (7) $\frac{3}{4}$ litre = $\dots\dots\dots$
[75 m , 750 cm^3 , 75 dm^3 , 0.075 m^3]
- (8) 2.5 litres = $\dots\dots\dots$
[0.25 m^3 , 2.5 cm^3 , 25 dm^3 , 2500 cm^3]

[3] Story Problems:

- (1) A pot in the shape of a cube if the length of its interior edge equals 20 cm, filled with black honey. Calculate the capacity of the pot of honey in litres.
- $\dots\dots\dots$



- (2) A cuboid-shaped tin of juice is with square base of inner side length 30 cm, if the height of the juice in the tin is 50 cm. Find the volume of juice in litres.
-

- (3) A swimming pool is in the shape of a cuboid whose internal dimensions are 40 m, 30 m and 1.8 m. Find its capacity in litres.
-

- (4) A cube-shaped vessel, its internal edge length is 30 cm, it's filled with cooking oil.

(a) Calculate the capacity of the vessel in litres.

(b) If the price of one litre of oil is 9.5 pounds, calculate the price of all the oil.

.....

.....

- (5) Two vessels: one of them is a cube with inner edge length 0.4 m and the other is a cuboid with inner dimensions 50 cm, 60 cm and 30 cm. Find the difference between the two capacities of the two vessels in millilitres.
-
-
-

- (6) If 500 cm^3 of a certain medicine are packed in small bottles and the capacity of each bottle is 25 ml. Find the number of needed bottles.
-



- (7) The internal dimensions of a cuboid-shaped vessel 75 cm, 40 cm and 150 cm. This vessel is filled with oil, the oil is put in bottles, if each bottle hold 1.5 litre. Find the number of needed bottles.
-
- (8) The capacity of a bottle is $\frac{3}{4}$ litre, it is filled with alcohol, it is wanted to put this amount in small bottles which the capacity of each of them is 25 cm³. Find the number of bottles.
-
- (9) A container has 12 litres of honey. It is wanted to put them in smaller bottles; the capacity of each of them is 400 cm³. Calculate the number of bottles which are needed for that.
-
- (10) A box for preserving food stuff in the shape of a cube whose the external edge length is 52 cm is made of a material of thickness 1 cm. Find the capacity of the box.
-



1-5 Applications on ratio (Rates)

Definition

The rate is the ratio between two quantities of different kinds.



Example

- 1) **A car consumes 30 litres of fuel to cover a distance of 300 km. Calculate the rate of consumption.**

- 2) **A typist types a sheet containing 630 words within 7 minutes. Find the rate of the typing.**

- 3) **A car covers 280 km. in 4 hours. Find the speed of the car.**

- 4) A worker paints a wall of area 96 m^2 in 8 hours. Calculate the rate of performance of the worker .

- 5) **An agricultural tractor ploughs six feddans in three hours. Find the rate of performance of the tractor. If another tractor ploughs six kirats in ten minutes , which of the two tractors has better performance ?**

2-1 The meaning of proportion

Definition

Proportion is an equality of two or more ratios.


Example

Complete the following table to make the numbers of the first row proportional to the corresponding numbers in the second row :

1)

2	.....	8	.....	15	.....
1	2	.....	9	.....	27

+ 2

x 2

2)

2	5	$4\frac{1}{2}$	.....	1.2	.....
6	.....	.....	45	.....	10

x

+

, then complete : $\frac{2}{6} = \frac{5}{.....} = \frac{.....}{.....} = \frac{.....}{.....} = \frac{.....}{.....} = \frac{.....}{.....}$

2-2 Properties of proportion

Property (1)

If we multiply (or divide) each of the two terms of a ratio by the same non-zero number, then the resultant ratio is equal to the first ratio and they together form a proportion.

Note that

(1) If $\frac{a}{b} = \frac{c}{d}$, then the numbers a , b , c and d are proportional and vice versa

If a , b , c and d are proportional, then $\frac{a}{b} = \frac{c}{d}$

(2) If $\frac{a}{b} = \frac{c}{d}$, then $a : b = c : d$

Property (2)

The product of extremes = the product of means


Example

Find the missing number in each of the following proportions :

1) $\frac{4}{12} = \frac{20}{\dots}$

2) $\frac{4}{7} = \frac{\dots}{35}$

3) $\frac{\dots}{32} = \frac{9}{36}$


Example

Find the missing term in each of the following for the numbers to be proportional :

4) 3 , , 9 , 24

5) 7.5 , 3.5 , , 2.8

6) $2\frac{1}{4}$, $\frac{1}{2}$, $6\frac{3}{4}$,

7) 6 , 12 , 25 and x

8) x , 16 , 28 and 32



Example

- 9) **A car consumes 18 litres of petrol to cover 240 km. Find :**
- a. **The number of litres of petrol that the car needs to cover 180 km.**
-
-
-
- b. **The distance that the car covers to consume 15 litres.**
-
-
-
- 10) **The price of 4 feddans is L.E. 5000 , if you have L.E. 20000 , then how many feddans can you buy ?**
-
-
-
- 11) **The height of a tree is 10.5 m. and the length of its shadow is 7.5 m. Find the height of a house whose shadow length is 11.5 m. at the same time.**
-
-
-

- 12) A car consumes 12 litres of fuel every 96 hours working. How many litres of fuel do the car consume in 144 hours working?


Example

Find the value of x in each of the following proportions :

13) $\frac{x+5}{3} = \frac{14}{6}$

14) $\frac{5}{10} = \frac{1.5}{x-4}$

15) $\frac{2x+30}{4} = 25$

16) $\frac{5(x-3)}{6} = \frac{10}{12}$


Example
Complete :

17) If $\frac{4}{7} = \frac{x}{35}$, then $x - 3 = \dots\dots\dots$

18) If $\frac{3}{7} = \frac{12}{y}$, then $3 \times y = \dots\dots\dots \times \dots\dots\dots$

19) If $\frac{a}{b} = \frac{c}{d}$, then $a \times d = \dots\dots\dots$

20) If $\frac{14}{x} = 0.7$, then $x = \dots\dots\dots$

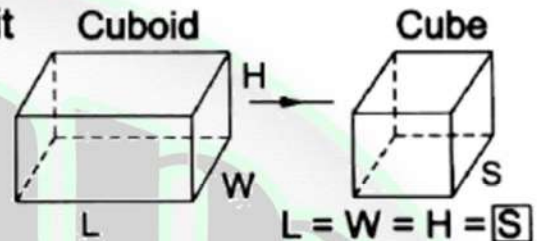
21) If $a : b = 2 : 5$, then $\frac{a}{a + b} = \dots\dots\dots$

3-5 The volume of the cube

Rule

Since , the cube is of equal dimensions and it is a special case of the cuboid

($L = W = H = \text{edge length}$)



Then , the volume of a cube = the edge length \times itself \times itself

$$V = S \times S \times S$$



Example

- 1) What is the volume of a cube of edge length 4 cm. long ?
.....
.....
- 2) Find the volume of the cube if the perimeter of one of its faces is 28 cm.
.....
.....
.....
- 3) The total area of a cube = 150 cm^2 . Calculate its volume.
.....
.....
.....

4) **The sum of lengths of all edges of a cube is 108 cm. Calculate its volume.**

5) **Find the volume of a cube of edge length 3 cm.**

6) **The total area of a cube = 54 cm^2 , calculate its volume.**

7) **Which is greater in volume : a cube of edge length 10 cm. or a cuboid of dimensions 15 cm. , 7 cm. and 10 cm. ?**

Then find the difference between their volumes.

- 8) A metallic cube of edge length 12 cm. was melted and changed into a number of equal cuboids of dimensions 8 cm. , 2 cm. and 9 cm. each.
Find out the number of the cuboids.

- 9) A piece of metal is in the shape of a cube of edge length 9 cm. was melted to be a cuboid of length 12 cm. and width 9 cm.
Find the height of the cuboid.

- 10) A metallic cube is of edge length 9 cm. It is wanted to be melted and converted into ingots in the shape of cuboids , each of them has the dimensions 3 cm., 3 cm. and 1 cm.
Calculate the number of ingots that are obtained.

3-6 The Capacity

Remarks :

(1) The litre (L.) and millilitre (mL.) are two units for measuring capacity or the volume of liquids.

(2) $1 \text{ millilitre} = 1 \text{ cm}^3$ and $1 \text{ litre} = 1 \text{ dm}^3$

So , $1 \text{ litre} = 1\,000 \text{ millilitre}$

The relation between the units of volume :

$$1 \text{ cm}^3 = 10 \times 10 \times 10 = 1\,000 \text{ mm}^3$$

$$1 \text{ dm}^3 = 10 \times 10 \times 10 = 1\,000 \text{ cm}^3$$

$$1 \text{ m}^3 = 10 \times 10 \times 10 = 1\,000 \text{ dm}^3$$



Example

Convert each of the following into litres :

1) $6\,500\text{ cm}^3$

2) 0.46 m^3

3) 7.64 dm^3

4) 750 mL



Example

Convert each of the following into cubic centimetres :

5) 0.006 m^3

6) 3.25 litres

7) $5\,700\text{ mm}^3$

8) 2.5 mL



Example

Convert each of the following into cubic metres :

9) 56 dm^3

10) $84\ 000 \text{ cm}^3$

11) 6.9 litres.

.....

.....

.....



Example

Complete :

12) 3.7 Litres \equiv cm^3

13) $5.4 \text{ dm}^3 \equiv$ L.

.....

.....

.....

14) $1200 \text{ cm}^3 \equiv$ Litres.

15) $1.2 \text{ m}^3 =$ mL.

.....

.....

.....



Example

- 16) A cuboid-shaped container of inner dimensions 25 cm. , 32 cm. and 17 cm. was filled with oil. Find the number of bottles needed to be filled up with that oil if the capacity of each bottle is 0.4 litre.

- 17) 6.5 litres of orange juice is poured in a cuboid-shaped container with a base of dimensions 26 cm. and 50 cm. Find the height of the juice in the container.

- 18) A cuboid-shaped tin with inner dimensions 40 cm. , 20 cm. and 25 cm. is completely filled with oil. Calculate the price of oil if the price of one litre is L.E. 4

- 19) A cuboid-shaped box without a lid has a base of outer dimensions 62 cm. and 52 cm. and its outer height is 31 cm. If the thickness of the material which the box was made of is 1 cm., Find the capacity of the box in litres.



Sheet 5 (The Rate)

1) Complete:-

- a) The ratio between two quantities of different types is called
- b) Average speed = $\frac{\text{.....}}{\text{time}}$
- c) A car covered a distance of 180 km in 1.5 hours. Then the average speed of this car is km / hr
- d) $A = \frac{1}{2} B$, then $A : B = \text{.....} : \text{.....}$
- e) A runner runs 640 m in 80 seconds, then his average speed is m/sec
- f) If the average speed of a train is 90 km/hr and the covered distance is 315 km, then the time of the trip is hours.

- 2) If three machines are needed to irrigate 32 feddans every day, calculate how many machines are needed to irrigate 256 feddans in one day?
-
-
-

- 3) A car consumes 10 litres of benzene to cover 140 km. **Find:**

- a) The number of the litres of benzene that the car needs to cover 238 km.
-
-

- b) The distance that the car covers to consume 15 litres.
-
-

- 4) A car traveled from Cairo to Qena in 6 hours, if the distance between the two cities is 651km, then calculate the average of the speed of the car.
-
-
-
-

1) Complete:-

- | | | | | |
|----------|-------|-------|-----|-------|
| Distance | ..... | 240 | 400 | ..... |
| Time | 2 | ..... | 5 | 7 |

.....

.....

.....

.....

-
-
-
-

d) 2, 3,, 6

Sheet 12 (Volume of cube)

Volume: is the number of cubic units which form the solid

The Volume of a cube = edge length \times edge length \times edge length
= base area \times edge length

The base area of a cube = volume \div edge length

Edge length of a cube = volume \div base area

1) Find the volume of the cube of side length 7 cm.

.....
.....

2) Find the volume of a cube of side length :

a) 10 cm

b) 4 cm

c) 8 cm

d) 12 cm

.....
.....

3) Find the volume of the cube if the sum of its edge lengths is 60 cm.

.....
.....

4) Find the volume of a cube, if its base area is 36 cm^2

.....
.....

5) Find the volume of a cube, if the sum of its side lengths is 132 cm

.....
.....
.....
.....

Sheet 14 (The capacity)

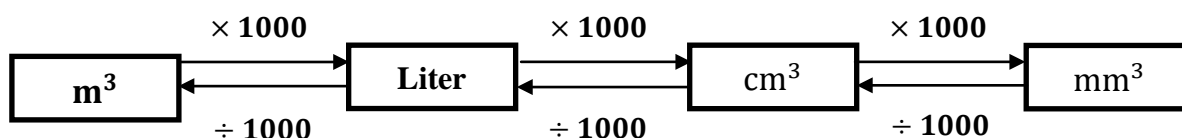
Capacity: is the amount that the container can hold.

The litre: is the unit of measuring capacity.

The litre: is the capacity of a cube of edge 1 dm (1dm = 10 cm)

One litre = $10\text{ cm} \times 10\text{ cm} \times 10\text{ cm} = 1000\text{ cm}^3$

How to change between the units of capacity



1) Convert each of the following:

a) 74 litres = cm^3

b) $5.62\text{ dm}^3 = \dots\dots\dots \text{litre}$

c) 962 litres = m^3

d) $45\text{ cm}^3 = \dots\dots\dots \text{ml}$

e) $0.62\text{ dm}^3 = \dots\dots\dots \text{cm}^3$

f) $5.49\text{ m}^3 = \dots\dots\dots \text{cm}^3$

2) Find the capacity of the cube of edge 18 cm long.

.....

3) Find the capacity of a cuboid of inner dimensions 21 cm, 17 cm and 14 cm.

.....

.....

4) A cuboid shaped box which its outer dimensions 54 cm, 40 cm and 38 cm , and the thickness of its material is 1.5 cm. Find the capacity of the box in litres, if :

a) The box with a lid

b) The box without a lid

.....

.....

.....

- 5) The edge of a metallic cube is 15 cm long. It is melted and reshaped as a cuboid of base dimensions 8 cm and 10 cm. Find the height of the cuboid to the nearest cm.

.....
.....
.....

- 6) A piece of iron takes the shape of a cuboid of dimensions 24 dm, 16 dm and 8 dm. It is melted and changed into small cubes each with edge 8 cm . Find the number of these cubes.

.....
.....
.....

- 7) A piece of metal is dropped in a cuboid shaped water tank of base area 288 dm^2 , if the height of water in the tank has increased by 60 cm. Find the volume of the metallic piece.

.....
.....
.....

- 8) A cuboid tank whose inner dimensions are 12 cm, 25 cm and 40 cm is full of honey, if the price of one litre is L.E 25 . Calculate the price of honey.

.....
.....
.....

اكتب ذاكرولي في البحث وانضم لجروبات ذاكرولي
مع رياض الاطفال للصف الثالث الاعدادي

Complete:

- 1) $1.45 \text{ litre} + 0.5 \text{ dm}^3 = \dots\dots\dots \text{ litre.}$
- 2) If the surface area of one face of a cube is 9 cm^2 , then its volume is $\dots\dots \text{ cm}^3$
- 3) The two diagonals are equal in length in both $\dots\dots\dots$ and $\dots\dots\dots$
- 4) A sweet case in the shape of a cuboid its internal dimensions are 21 cm. , 18 cm. and 6 cm. it is wanted to fill it with pieces of chocolate each of them is a cuboid of dimensions 3 cm. , 3 cm. and 1 cm. Calculate the number of pieces of chocolate to fill the case completely.
- 5) $2000 \text{ cm}^3 = \dots\dots\dots \text{ litres.}$
- 6) If the volume of a cube = 8 cm^3 , then the edge length = $\dots\dots\dots \text{ cm.}$
- 7) The volume of a cuboid whose dimensions are 3 cm., 2 cm. and 5 cm. = $\dots\dots$
- 8) A vessel in the shape of a cube, the length of its interior edge equals 20 cm. filled with honey. Calculate the capacity of the vessel in litres.
- 9) If one of the angles of a parallelogram is right, then it will be called $\dots\dots$
- 10) $8200 \text{ mm}^3 = \dots\dots\dots \text{ cm}^3$
- 11) The best unit for estimating the volume of the classroom is $\dots\dots\dots$
- 12) Find the edge length of a cube whose volume is 125 cm^3 , then Find the area of one of its faces.
- 13) If the capacity of a tank in the shape of cuboid is 72000 L., Find the area of the base if the height is 4 m.
- 14) A cube whose edge length is 0.4 dm., then its volume = $\dots\dots\dots \text{ cm}^3$

- 15) A metallic piece in the shape of a cube whose edge length is 6 cm. It is melted and converted to a cuboid with a square base of side length 4 cm. Find the height of the cuboid.
- 16) A cube of edge length 9 cm. , then the sum of all of its edges lengths =cm.
- 17) The centimetre cube is a unit for measuring
- 18) A cuboid whose dimensions are 3 cm. , 2 cm. and 5 cm., then its volume = cm.³
- 19) A glass vessel is cubed shape , its inner edge length is 30 cm., this vessel contains an amount of water, if we throw a metallic piece in it , then the water level raised 5 cm. because of that. Find the volume of the metallic piece.
- 20) If the area of a face of a cube = 4 cm.², then its volume in cm.³ equals =
- 21) A metallic cube of edge length 9 cm. , it is wanted to be melted and convert it into ingots in the shape of cuboids each of them has the dimensions 3 cm. , 3 cm. and 1 cm. Calculate the number of ingots that are obtained.
- 22) A swimming pool in the shape of cuboid whose internal dimensions are 40m. , 30 m. and 1.8 m. Find its capacity in litres.
- 23) 4 m.³ = dm.³
- 24) The two diagonals are perpendicular in each of and

1 Complete :

[a] The product of the extremes = the product of

[b] The fourth proportional term in 3 , 6 and 12 is

[c] If $a : b = 2 : 3$ and $b : c = 4 : 5$, then $a : c = \dots : \dots$

[d] If 3 , x , 12 and 16 are proportional numbers , then $x = \dots$ and it is called the term.

[e] If $\frac{5}{9} = \frac{15}{x}$, then $x = \dots$

2 Complete the missing number in each of the following proportions :

[a] 2 , 11 , 8 ,

[b] 5 , 8 ,, 24

[c] 9 ,, 4.5 , 4

[d], 7 , 24 , 56

3 [a] A car consumes 20 litres of fuel to cover a distance of 180 km.

How many litres are needed to cover 540 km.

[b] A machine ploughs 6 feddans in 3 hours , *find the rate of performance of this machine.* If another machine ploughs 6 kirats in 10 minutes , *which of the two machines is better ?*

4 Choose the correct answer :

[a] If $\frac{a+6}{20} = \frac{1}{2}$, then $a = \dots$ (6 or 4 or 3 or 10)

[b] If the numbers 2 , 3 , 4 and x are proportional , then the value of $x = \dots$ (5 or 6 or 7 or 8)

[c] $\frac{2}{5} = \frac{\dots}{17.5}$ (35 or 10 or 7 or 2.5)

[d] If $\frac{a}{b} = \frac{1}{2}$ and $b : c = 4 : 7$, then $a : c = \dots$ (1 : 14 or 4 : 7 or 3 : 7 or 2 : 7)

[e] If $3a = 4b$, then $\frac{a}{b} = \dots$ ($\frac{3}{4}$ or $\frac{2}{3}$ or $\frac{4}{3}$ or $\frac{3}{2}$)

5 A machine produces 1 400 m. of textile in two hours. *Calculate the needed time to produce 4 900 m. of textile.*

Complete:

- 1) $1.45 \text{ litre} + 0.5 \text{ dm}^3 = 1.95 \text{ litre.}$
- 2) If the surface area of one face of a cube is 9 cm^2 , then its volume is 27 cm^3
- 3) The two diagonals are equal in length in both Square and Rectangle
- 4) A sweet case in the shape of a cuboid its internal dimensions are 21 cm. , 18 cm. and 6 cm. It is wanted to fill it with pieces of chocolate each of them is a cuboid of dimensions 3 cm. , 3 cm. and 1 cm. Calculate the number of pieces of chocolate to fill the case completely. 252 Pieces
- 5) $2000 \text{ cm}^3 = 2 \text{ litres.}$
- 6) If the volume of a cube $= 8 \text{ cm}^3$, then the edge length $= 2 \text{ cm.}$
- 7) The volume of a cuboid whose dimensions are 3 cm. , 2 cm. and $5 \text{ cm.} = 30 \text{ cm}^3$
- 8) A vessel in the shape of a cube, the length of its interior edge equals 20 cm. filled with honey. Calculate the capacity of the vessel in litres. 8 L.
- 9) If one of the angles of a parallelogram is right, then it will be called Rectangle
- 10) $8200 \text{ mm}^3 = 8.2 \text{ cm}^3$
- 11) The best unit for estimating the volume of the classroom is m^3
- 12) Find the edge length of a cube whose volume is 125 cm^3 , then find the area of one of its faces. $S = 5 \text{ cm}$ $A = 25 \text{ cm}^2$
- 13) If the capacity of a tank in the shape of cuboid is 72000 L. , Find the area of the base if the height is 4 m. $\frac{72}{4} = 18 \text{ m}^2$
- 14) A cube whose edge length is 0.4 dm. , then its volume $= 64 \text{ cm}^3$

- 15) A metallic piece in the shape of a cube whose edge length is 6 cm. It is melted and converted to a cuboid with a square base of side length 4 cm.

Find the height of the cuboid. $\frac{216}{4 \times 4} = 13.5 \text{ cm}$

- 16) A cube of edge length 9 cm., then the sum of all of its edges lengths = 108 cm.

- 17) The centimetre cube is a unit for measuring Volume

- 18) A cuboid whose dimensions are 3 cm., 2 cm. and 5 cm., then its volume = 30 cm.³

- 19) A glass vessel is cubed shape, its inner edge length is 30 cm., this vessel contains an amount of water, if we throw a metallic piece in it, then the water level raised 5 cm. because of that. Find the volume of the metallic piece. 4500 cm³

- 20) If the area of a face of a cube = 4 cm.², then its volume in cm.³ equals = 8 cm.³

- 21) A metallic cube of edge length 9 cm., it is wanted to be melted and convert it into ingots in the shape of cuboids each of them has the dimensions 3 cm., 3 cm. and 1 cm. Calculate the number of ingots that are obtained. 81 ingots

- 22) A swimming pool in the shape of cuboid whose internal dimensions are 40m., 30 m. and 1.8 m. Find its capacity in litres. 216000 L

- 23) 4 m.³ = 4000 dm.³

- 24) The two diagonals are perpendicular in each of Square and Rhombus

1 Complete :

- [a] The product of the extremes = the product of *means*
[b] The fourth proportional term in 3 , 6 and 12 is *24*
[c] If $a : b = 2 : 3$ and $b : c = 4 : 5$, then $a : c = \dots 8 \dots : \dots 15 \dots$
[d] If 3 , x , 12 and 18 are proportional numbers , then $x = \dots 4 \dots$ and it is called the *second* term.
[e] If $\frac{5}{9} = \frac{15}{x}$, then $x = \dots 27 \dots$

2 Complete the missing number in each of the following proportions :

- [a] 2 , 11 , 8 , *44* [b] 5 , 8 , *15* , 24
[c] 9 , *8* , 4.5 , 4 [d] *3* , 7 , 24 , 56

3 [a] A car consumes 20 litres of fuel to cover a distance of 180 km.

How many litres are needed to cover 540 km. 60 L

[b] A machine ploughs 6 feddans in 3 hours , find the rate of performance of this machine. If another machine ploughs 6 kirats in 10 minutes , which of the two machines is better ? *First is better*

4 Choose the correct answer :

- [a] If $\frac{a+6}{20} = \frac{1}{2}$, then $a = \dots$ (6 or **4** or 3 or 10)
[b] If the numbers 2 , 3 , 4 and x are proportional , then the value of $x = \dots$ (5 or **6** or 7 or 8)
[c] $\frac{2}{5} = \frac{\dots}{17.5}$ (35 or 10 or **7** or 2.5)
[d] If $\frac{a}{b} = \frac{1}{2}$ and $b : c = 4 : 7$, then $a : c = \dots$ (1 : 14 or 4 : 7 or 3 : 7 or **2 : 7**)
[e] If $3a = 4b$, then $\frac{a}{b} = \dots$ ($\frac{3}{4}$ or $\frac{2}{3}$ or **$\frac{4}{3}$** or $\frac{3}{2}$)

5 A machine produces 1 400 m. of textile in two hours. Calculate the needed time to produce 4 800 m. of textile. *7 hours*